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A revision of the genus *Hypotrix* Guenée in North America with descriptions of four new species and a new genus (Lepidoptera, Noctuidae, Noctuinae, Eriopygini)

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Abstract

The genus *Hypotrix* Guenée, 1852 is synonymized with *Trichorthosia* Grote, 1883, *Proteinania* Hampson, 1905, *Ursogastra* Smith, 1906, and *Trichagrotis* McDunnough, [1929]. Four species are transferred from the genus *Hexorthodes* McDunnough [*Hypotrix trifascia* (Smith, 1891), **comb. n.**, *H. alamosa* (Barnes, 1904), **comb. n.**, *T. hueco* (Barnes, 1904), **comb. n.**, and *T. optima* (Dyar, 1920), **comb. n.**]. Four new species are described (*T. basistriga* Lafontaine, Ferris & Walsh; *T. naglei* Lafontaine, Ferris & Walsh;

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T. ocularis Lafontaine, Ferris & Walsh; and *T. rubra* Lafontaine, Ferris & Walsh). A new genus, *Anhypotrix* Lafontaine, Ferris & Walsh, is proposed for *Polia tristis* Barnes & McDunnough, 1910, currently misplaced in *Trichorthosia*. A key to species, descriptions, illustrations of adults and genitalia are included.

Keywords

Taxonomy, *Anhypotrix*, *Hexorthodes*, *Hypotrix*, *Proteinania*, *Trichagrotis*, *Trichorthosia*, *Ursogastra*, Arizona, Brazil, Colorado, Mexico, New Mexico, Texas, Utah

Introduction

The genus *Hypotrix* Guenée, 1852 includes 23 species occurring from southern Mexico southward to Brazil and Peru (Poole 1989). These species, together with 11 species of *Trichorthosia* Grote, 1883, mainly from southwestern United States and Mexico, one species of *Ursogastra* Smith, 1906, one species of *Trichagrotis* McDunnough, [1929], and four species transferred from *Hexorthodes* McDunnough, [1929], are brought together to form an expanded concept of *Hypotrix*. Although this assemblage of species is dissimilar in adult appearance, genital characters and the "barcode" (part of Cox1 *mt* DNA) indicate that they form a monophyletic group. The most easily observed diagnostic character for the genus is the form of the anal papillae in the female. These are swollen and bulbous basally, then abruptly tapered to a narrow pointed apex. In preserved specimens the anal papillae are frequently curved below the end of the abdomen, sometimes by as much as 180° to project anteriorly. In males the diagnostic character is the membranous flap arising from the middle of the sacculus and partially overtopping the sclerotized part of the sacculus. The genus is peculiar in that there are frequently masses of long scales on the pleural membrane of the abdomen of the male, especially prolific in Central and South American *Hypotrix* species, but sometimes seen in other species as well, such as *H. ocularis*, sp. n., *H. hueco* (Barnes), and *H. lunata* (Smith). In some species these scales form persistent patches that at first look like basal abdominal brushes, but there are no levers or pockets so the scales cover the underside of the abdomen like a cloak. Some species have a basal abdominal brush, with a lever and pocket, as well as a secondary tuft of scales almost at the same place (e.g., *H. purpurigera* Guenée, Fig. 49); in some species the brushes are present but the levers are vestigial and the pockets have been lost (e.g., *H. ocularis*, Fig. 50); in other species the secondary abdominal tufts are posterior to the position where the basal abdominal brushes would be (e.g., *H. lunata*, Fig. 51). There is a great deal of structural diversity in *Hypotrix* in Central and South America and although the group appears to be monophyletic, a revision of the entire group may find that arranging the group into several genera is preferable.

The closest relative of *Hypotrix* appears to be *Orthodes* Guenée. The two genera have the membranous area on the sacculus, which in some species of *Orthodes* is enlarged into a long eversible coremata, and basally swollen anal papillae, although in *Orthodes* the papillae are membranous and broad posteriorly. The two genera typically associate in barcode analyses.

Most species in the genus can be arranged in one of two groups. In the first group (formerly *Trichorthosia*, *Trichagrotis*, and some already in *Hypotrix*), the uncus is spatulate apically, the cucullus is separated from the rest of the valve by a deep ventral notch, the anal angle of the cucullus has an enlarged cornutus, the digitus is slender and tapered, and in the female genitalia the two sides of the ductus bursae are similar. In the second group (*Ursogastra*, *Proteinania*, the species removed from *Hexorthodes*, and some already in *Hypotrix*) the uncus is broad, lightly sclerotized, and densely setose, the cucullus is lightly sclerotized and setose, the digitus is apically blunt or spatulate, and in the female genitalia the ductus bursae has a prominent bulge to the left when viewed ventrally. Although this distinction works generally, there is some overlap in the distribution of the characters, and some of the characters are missing in some species in each group, so a formal taxonomic recognition of the two groups, even as subgenera, seems impractical. The exception is "*Trichorthosia*" *tristis* (Barnes & McDunnough), which shows no structural affinities with *Hypotrix*, or with any other known genus, so it is placed in *Anhypotrix* gen. n.

The type-species, *Hypotrix purpurigera*, is one of the more atypical species in the genus in male genitalia (Fig. 32), although in external appearance (Fig. 17) and female genitalia (Fig. 47), it is similar to other species in *Hypotrix*. In the male genitalia the membranous flap from the cucullus forms a large setose membrane over the entire ventral half of the valve and tapers to a point at the neck of the cucullus. The clasper and digitus are reduced and mainly rod-like; they extend posteriorly just below the costal margin of the valve and end in short, pointed processes at the costal angle of the valve. The cucullus is reduced to a small rounded lobe with a multiple-rowed corona covering the apical half. The male vesica and female genitalia are most like those of *H. hueco* and *H. lunata*.

In addition to the new combinations proposed in the systematcs section, the synonymy of *Trichorthosia* with *Hypotrix* creates the following additional combinations. *Hypotrix cirphidia* (Draudt, 1924), comb. n., *H. clarcana* (Dyar, 1916), comb. n., *H. diapera* (Hampson, 1913), comb. n., *H. duplicilinea* (Dognin, 1908), comb. n., *H. euryte* (Druce, 1898), comb. n., *H. niveilinea* (Schaus, 1894), comb. n., *H. umbrifer* (Dyar, 1916), comb. n.

Materials and methods

Repository abbreviations

Specimens were examined from the following collections:

AMNH American Museum of Natural History, New York, New York, USA.

BMNH The Natural History Museum (statutorily, British Museum (Natural History)), London, UK.

CDF Personal Collection of Clifford D. Ferris, Laramie, Wyoming, USA.

CNC Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada.

CUIC Cornell University Insect Collection, Ithaca, New York, USA.
JBW Personal collection of J. Bruce Walsh, Tucson, Arizona, USA.
NMSU New Mexico State University, Las Cruces, New Mexico, USA.
RL Personal collection of Ronald H. Leuschner, Manhattan Beach, California, USA.
TLSC Texas Lepidoptera Survey Collection, Houston, Texas, USA.
USNM National Museum of Natural History (formerly, United States National Museum), Washington, District of Columbia, USA.

Dissecting methods and genital terminology. Dissection of genitalia and terms for genital structures and wing markings follow Lafontaine (2004).

Hypotrix Guenée, 1852

Type species. *Hypotrix purpurigera* Guenée, 1852, by subsequent designation by Hampson 1905.

Trichorthosia Grote, 1883, **syn. n.**
Type species: *Trichorthosia parallela* Grote, 1883, by monotypy.

Proteinania Hampson, 1905, **syn. n.**
Type species: *Chloridea vigasia* Schaus, 1894, by original designation.

Ursogastra Smith, 1906, **syn. n.**
Type species: *Ursogastra lunata* Smith, 1906, by monotypy.

Trichagrotis McDunnough, [1929], **syn. n.**
Type species: *Trichorthosia spinosa* Barnes & McDunnough, 1912, by original designation.

Diagnosis. Adults. Males and females of similar size (forewing length 13–18 mm). *Head* – Male antenna beadlike to biserrate, lateral setae tending to group into two tufts on each side and clearly doubly bifasciculate in some species. Female antenna filiform, minutely setose ventrally. Frons rounded and usually covered with long scales, but partially exposed and centrally roughened in some species. Eye covered with surface hair. Labial palpus porrect or slightly upturned, apical segment usually about 1/3 as long as second segment, occasionally 1/4 as long (e.g., *H. lunata*) to 1/2 as long (e.g., *H. naglei*). *Thorax* – *Wings*: Forewing ground color typically gray, brown, or orange; pattern variable but typically with reniform and orbicular spots with a pale outline, often filled with black, especially in Neotropical species; subterminal line typically straight. Hindwing white to fuscous. *Legs*: Sclerotized spiniform setae on middle and hind tibiae in most species formerly associated with *Trichorthosia*; spiniform setae on all tibiae in *H. spinosa*. Basitarsus with three ventral rows of spiniform setae; central row of setae tending to

duplicate into two irregular rows on tarsal segments 2–5. *Abdomen* – Base of abdomen usually without basal abdominal brushes (e.g., *H. trifascia*, Fig. 52), but fully-developed brushes, levers and pockets in a few species including type-species *H. purpurigera* (Fig. 49). Brushes present but levers vestigial in some species (e.g., *H. ocularis*, Fig. 50). Many species, especially those formerly in *Hypotrix*, with masses of long scales in pleural membrane of abdomen and in some species one or more patches of scales persistently attached (e.g., *H. lunata*, Fig. 51). Eighth abdominal sternum of male with a tuft of long setae on a short eversible coremata in most species. *Male genitalia* – Uncus typically with expanded often spatulate apex. Valve usually with well-defined triangular cucullus with narrow "neck," apical corona, usually with one stout seta near anal angle, and digitus narrow and tapered and projecting into ventral notch proximal to cucullus; a subgroup with cucullus mainly membranous, defined by slight "neck," with corona reduced or absent; apex of digitus blunt or rounded; clasper a simple curved (or slightly S-shaped) rod projecting above dorsal margin of valve; sacculus only sclerotized dorsally with middle part of sacculus forming membranous flap partially overtopping sclerotized part and extending to posteriorly to "neck" of cucullus. Vesica most often long and partially coiled, usually with band of minute spinules toward apex, with several to many long spike-like cornuti in subbasal swollen area; some species with thorn-like spine or tight cluster of cornuti at apex of aedeagus, and some with cornutus with bulbous base on small diverticulum. *Female genitalia* – Corpus bursae thin and membranous, rounded or oval, without obvious signa. Appendix bursae typically long and coiled. Ductus bursae heavily sclerotized, usually about as long as corpus bursae. Anterior and posterior apohyses rod-like, 1.0–1.5 × length of abdominal segment eight. Anal papillae diagnostic; base swollen, almost bulbous laterally, then abruptly tapered to a narrow almost spine-like apex; apex of anal papillae usually down-turned and when protruding, often bending ventrally through 180° to project anteriorly.

Key to North American species of *Hypotrix*

1. Forewing longitudinally streaked; antemedial, medial, and postmedial lines absent **2**
– Forewing pattern mottled or well defined but not longitudinal streaking; some transverse lines evident **3**
2. Forewing with yellow or orange on veins and black streaks between veins .... ***H. ferricola***
– Forewing cream colored with fine dark streaks and speckling and dark shading toward posterior margin of wing ..... ***H. diplogramma***
3. Reniform spot large, black and crescentic, usually fused to rounded black orbicular spot ..... ***H. lunata***
– Reniform spot, if dark, then kidney shaped or oval **4**
4. Middle and hind tibiae with spiniform setae posteriorly near tibial spurs ... **5**
– Middle and hind tibiae without spiniform setae **8**
5. Forewing with subterminal line straight with dark line proximally **6**
– Forewing with subterminal line absent or irregular 7

6. Reniform and orbicular spots with pale contrasting outline; foretibia with spiniform setae ..... ***H. spinosa***
– Reniform spot mainly obscure, except for dark area in lower part of reniform spot; orbicular spot a dark dot; foretibia without spiniform setae ..... ***H. parallela***
7. Forewing without basal dash; antemedial line separated from orbicular spot by distance equal to width of line ..... ***H. ocularis***
– Forewing with black basal dash; antemedial line touching orbicular spot ..... ***H. basistriga***
8. Forewing silvery gray with contrasting orange and orange-brown shading in terminal area ..... ***H. naglei***
– Forewing reddish brown, orange brown, or yellow brown; terminal area similar in color to remainder of forewing **9**
9. Forewing with three mainly parallel dark and/or light transverse lines ..... ***H. trifascia***
– Forewing with transverse lines more irregular **10**
10. Forewing with reniform and orbicular spots gray with contrasting yellow triangular spot between them and below costa ..... ***H. optima***
– Forewing without yellow between reniform and orbicular spots **11**
11. Forewing with medial area much paler than basal and subterminal areas, so reniform and orbicular spots contrastingly darker ..... ***H. hueco***
– Forewing with medial area similar in color to basal and subterminal areas and with reniform and orbicular spots not especially contrasting **12**
12. Forewing with subterminal line irregular; reniform and orbicular spots with pale-yellow outline; reniform and orbicular spots not especially contrasting. ..... ***H. alamosa***
– Forewing with subterminal line straight, except toward apex; reniform spot mainly obscure, except for dark area in lower part of spot; orbicular spot absent ..... ***H. rubra***

Systematics

***Hypotrix ferricola* (Smith, 1905), comb. n.**
Figs 1, 2, 19, 34

Leucania ferricola Smith, 1905: 203.

Type material. Holotype ♂. Arizona, Cochise Co. AMNH, examined.

Other material examined and distribution. Mexico: State of Durango (Sierra Madre Occidental). **USA:** Arizona: Cochise Co. (Chiricahua Mts), Graham Co. (Pinaleno Mts), Pima Co. (Santa Catalina Mts), and Santa Cruz Co. (Santa Rita Mts). New Mexico: Grant Co.

Diagnosis. Within United States the boldly streaked orange and blackish-gray forewing pattern of *Hypotrix ferricola* is unmistakable. *Hypotrix ferricola* is closely related to *H. aselenographa* (Dyar, 1916), comb. n. [*Trichorthosia aselenographa* Dyar, 1916] from Mexico, except the subterminal line in *H. ferricola* is parallel to the wing margin in the middle part of the wing and then curves outward near the forewing apex (the subterminal line is almost straight to the forewing apex in *H. aselenographa*, so the terminal area is broad mesially and tapered toward each end), and the dark patch in the cell through the reniform and orbicular spots is paler, so the orbicular spot is evident as a dark streak and the reniform spot as a dark crescent (the streak in the cell in *H. aselenographa* is black, completely obscuring the reniform and orbicular spots). The forewing length in *H. ferricola* is 13 to 15 mm. The *male genitalia* of *H. ferricola* have a small, triangular, heavily sclerotized cucullus with a stout seta at the anal angle, a rounded U-shaped notch in the ventral margin of the valve anterior to the cucullus, an apically spatulate uncus, and a long, slender digitus. The vesica is very long and narrow with a dense band of spinules on the apical half, a stout rose-thorn spine at the base, and a field of six or seven spike-like cornuti subbasally. In the *female genitalia* the corpus bursae is rounded and the appendix bursae is long and narrow and gently coiled.

Distribution and biology. *Hypotrix ferricola* occurs in southeastern Arizona, southwestern New Mexico, and northern Mexico. Collecting dates range from early April to early August, possibly representing several generations. Most records are from ponderosa pine forests.

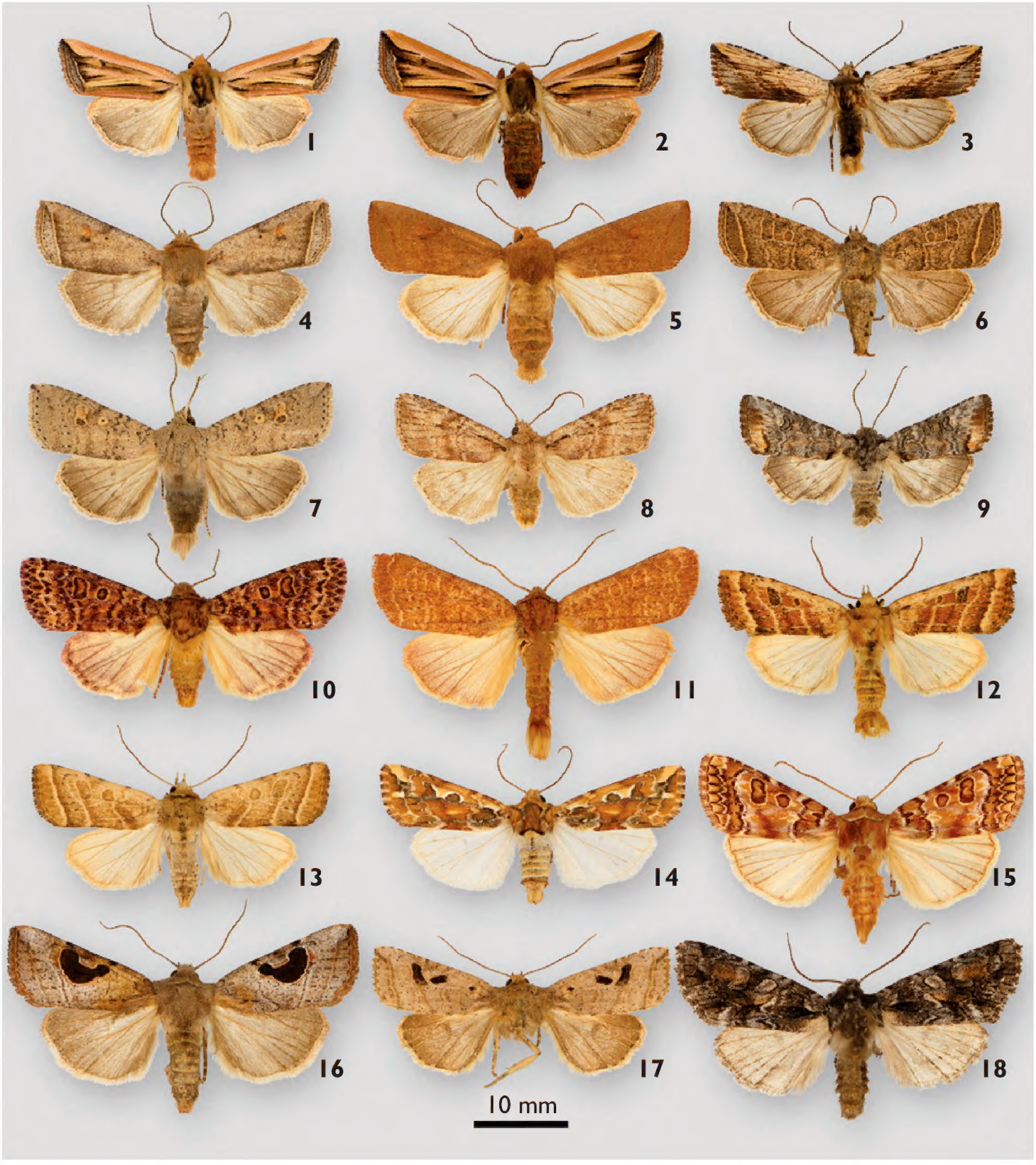
***Hypotrix diplogramma* (Schaus, 1903), comb. n.**
Figs 3, 20, 35

Himella diplogramma Schaus, 1903: 232.
Morrisonia albidior Barnes and McDunnough, 1910: 153.
Scriptania inquisita Dyar, [1920]: 164.

Type material. *Himella diplogramma*: **syntypes**, USNM, examined. Type locality: Mexico, Las Vigas. *Morrisonia albidior*: **syntypes**, USNM, examined. Type locality: USA, Arizona, Redington. *Scriptania inquisita*: **holotype** ♀, USNM, examined. Type locality: Mexico, Mexico City.

Other material examined and distribution. Mexico: Veracruz; Federal District. **USA:** Arizona: Cochise Co. (Chiricahua Mts), Graham Co. (Pinaleno Mts), Pima Co. (Santa Catalina Mts), Santa Cruz Co. (Santa Rita Mts), and Yavapai Co. New Mexico: Grant Co.

Diagnosis. *Hypotrix diplogramma* is unmistakable in appearance, but structurally it is closely related to *H. ferricola* and similar in size (forewing length: 13–15 mm). The subterminal line is a diffuse series of dark streaks, so the gray shading of the terminal area, so well defined in *H. ferricola*, bleeds into the subterminal area in *H. diplogramma*. Most of the forewing is cream colored with fine black streaks on and between the veins, and the dark shading intensifies toward the posterior margin of the wing, forming a



Figures 1–21. *Hypotrix* and *Anhypotrix* adults. **1** *H. ferricola*, 1 ♂, Arizona, Pima Co., Santa Catalina Mts, 7800' **2** *H. ferricola*, ♀, Arizona, Graham Co., Pinaleno Mts, 9000' **3** *H. diplogramma* ♂, Arizona, Pima Co., Santa Catalina Mts, 7800' **4** *H. parallela* ♂, Arizona, Cochise Co., Huachuca Mts, 6200' **5** *H. rubra* ♀, Arizona, Pima Co., Mt. Lemmon **6** *H. spinosa* ♀, Mexico, Durango, 10 mi W El Salto, 9000' **7** *H. ocularis* ♂, Arizona, Cochise Co., Chiricahua Mts, Onion Saddle, 7700' **8** *H. basistriga* ♀, Arizona, Apache Co., White Mts, 8300' **9** *H. naglei* ♂, Arizona, Pima Co., Santa Catalina Mts, Mt. Lemmon, 9100' **10** *H. alamosa* ♀, Arizona, Pima Co., Santa Catalina Mts, Mt. Lemmon, 9100' **11** *H. alamosa* ♀, Arizona, Cochise Co., Huachuca Mts, Ramsey Canyon, 6000' **12** *H. trifascia* ♂, New Mexico, Colfax Co., Sangre de Cristo Mts, 7900' **13** *H. trifascia* ♀, Arizona, Cochise Co., Huachuca Mts, Ash Canyon, 5100' **14** *H. optima* ♀, Arizona, Cochise Co., Chiricahua Mts, Onion Saddle, 7600' **15** *H. hueco* ♀, Arizona, Cochise Co., Huachuca Mts, Ash Canyon, 5100' **16** *H. lunata* ♀, Arizona, Santa Cruz Co., Santa Rita Mts, Madera Canyon, 4880' **17** *H. purpurigera* ♀, Brazil, Parana, Mandirituba **18** *Anhypotrix tristis* ♂, New Nexico, McKinley Co., Zuni Mts, McGaffey, 7500'.

large black patch in some specimens. The *male genitalia* are similar to those of *H. ferricola* but in *H. diplogramma* the ventral margin of the valve proximal to the subapical notch is extended ventrally into a sharply angled process defining the anterior margin of the notch. In the vesica the basal spine is minute, but the subbasal cornuti are much larger than in *H. ferricola*. The *female genitalia* are also similar to those of *H. ferricola*, but the appendix bursae is shorter and more tightly coiled basally in *H. diplogramma*.

Distribution and biology. *Hypotrix diplogramma* occurs from eastern Arizona and southwestern New Mexico southward at least to Mexico City. Collection dates are from late March to late October, probably representing multiple generations. Most records are from ponderosa pine forests.

***Hypotrix parallela* (Grote, 1883), comb. n.**
Figs 4, 21, 36

Trichorthosia parallela Grote, 1883: 31.
Taeniocampa terminatissima Dyar, 1904: 104.

Type material. *Trichorthosia parallela*: **holotype.** New Mexico [location unknown]. *Taeniocampa terminatissima*: **holotype** ♀ [USNM, examined]. Type locality: New Mexico, Las Vegas.

Other material examined and distribution. Mexico: State of Durango (Sierra Madre Occidental). **USA:** Arizona: Apache Co. (White Mts) and Cochise Co. (Huachuca Mts). Colorado: La Plata Co. (San Juan Mts); New Mexico: Colfax (Sangre de Cristo Mts), Grant Co. (Pinos Altos Mts), Lincoln (Capitan Mts), McKinley Co. (Zuni Mts), and Rio Arriba Co. Texas: Jeff Davis Co. (Davis Mts).

Diagnosis. *Hypotrix parallela* is a medium-sized species (forewing length: 13–15 mm) with a pale silky brownish-gray forewing and fuscous hindwing. Most of the forewing markings are obscure except for a straight white subterminal line bordered proximally by dark-gray, a dark spot in the lower part of the pale-orange reniform spot, and a small black dot in a pale area representing the orbicular spot. The medial line is somewhat diffuse but still distinctive because it extends in an oblique line from the costa to the dark patch in the reniform spot, then bends abruptly about 90° to continue in a straight but oblique line to the posterior margin of the forewing. There are spiniform setae near the ends of the middle and hind tibiae. The *male genitalia* are similar to those of *Hypotrix ferricola* and *H. diplogramma*, but the uncus is less spatulate apically, the cucullus much broader with a narrow gap between it and the sacculus, and the vesica has a bulbous cornutus on a short diverticulum about 1/3 from its base. The genitalia are most similar to those of *Hypotrix rubra*, described below. In the *female genitalia* the corpus bursae is much larger, and the appendix bursae is shorter and wider than in *H. ferricola* and *H. diplogramma*.

Distribution and biology. *Hypotrix parallela* occurs from southwestern Colorado southward through eastern Arizona, New Mexico, and western Texas to the State of

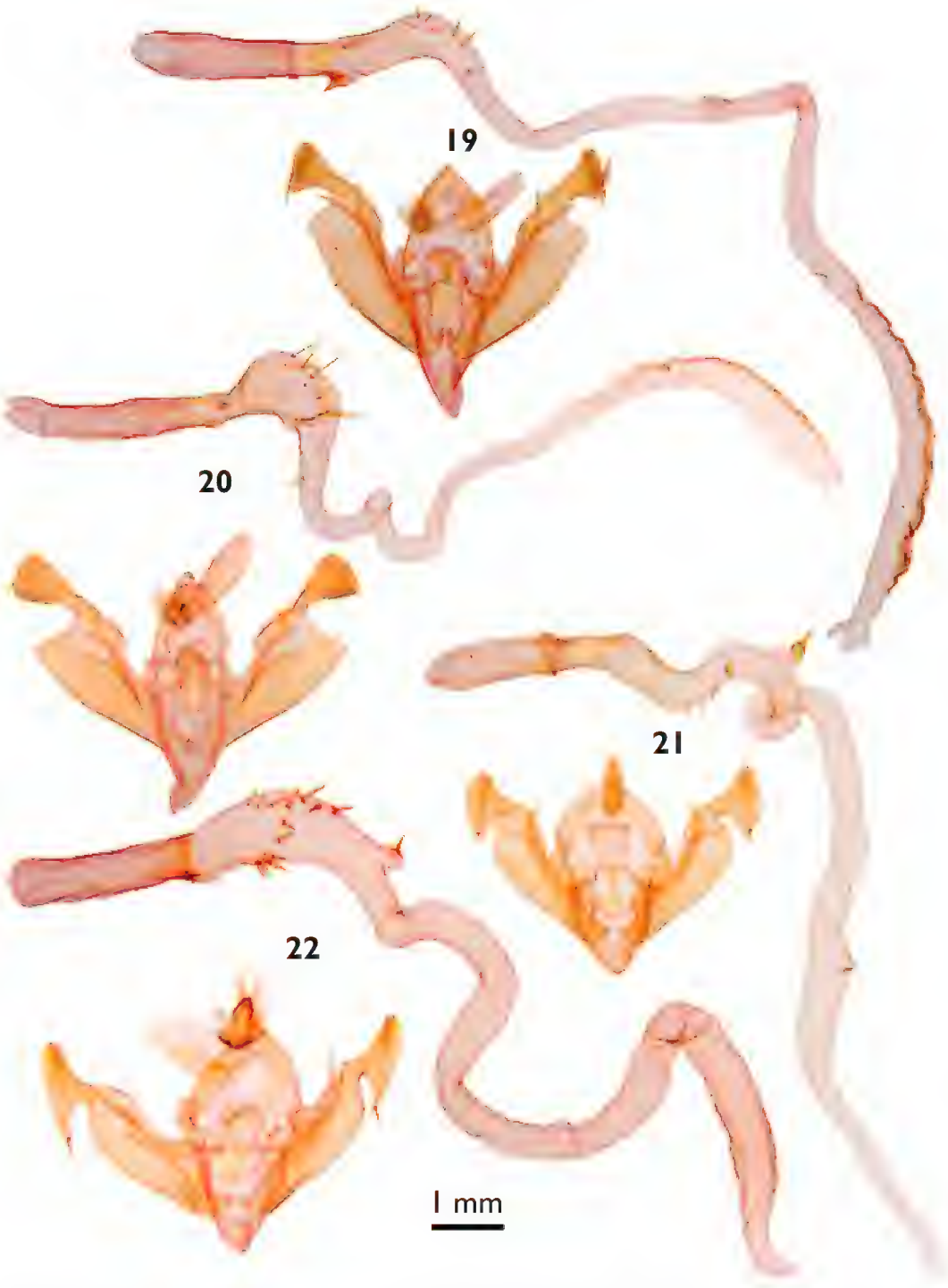
Durango in northern Mexico. Collecting dates range from early July to late August in ponderosa pine parkland.

***Hypotrix rubra* Lafontaine, Ferris & Walsh, sp. n.**
urn:lsid:zoobank.org:act:43B4BEE9-40D0-4411-A655-FFFE60626B33
Figs 5, 22, 37

Type material. Holotype ♂. Arizona, Cochise Co., Chiricahua Mts, Onion Saddle, 7700', Ponderosa pine/oak habitat, uv/mv lights, 6 June 2004, B. Walsh. CNC. **Paratypes:** 11 ♂, 35 ♀. **USA, Arizona.** Same locality and collector as for holotype, 26 May 2003, 6 June 2004, 6 June 2007, 14 June 2007 (2 ♂, 3 ♀); Cochise Co., Chiricahua Mts, Barfoot Park, 8370', 17 June 2009, C, D, Ferris (1 ♀); Cochise Co., Chiricahua Mts, canyon below Barfoot Park, 8320', 18 June 2009, C, D, Ferris (1 ♂); Cochise Co., Chiricahua Mts, Cave Creek Canyon, 5400', 18 May–19 June 1966, J. G. Franclemont (1 ♂, 7 ♀); Cochise Co., Chiricahua Mts, Onion Saddle, 7600', 27 June – 1 July 1967, J. G. Franclemont (4 ♀); Cochise Co., Chiricahua Mts, Shaw Peak Trail above Onion Saddle, 7630', 22 June 2008, C, D, Ferris (3 ♀); Cochise Co., Chiricahua Mts, mi 10.6 Turkey Creek Road, 6400', pine/oak forest, uv/mv lights, 5 May 2002, B. Walsh (1 ♂); Graham Co, Pinalena Mts, Cummingham Campground, 9000', 5 June 2007, B. Walsh (2 ♀); Graham Co., Mt. Graham (Pinellelo Mts), Snow Flat, 8775', 18 May 2009, C, D, Ferris (1 ♂); Pima Co., Mt Lemmon, Summerhaven, 25 May 1991, R. Nagle (1 ♀); Pima Co., Mt Lemmon, Summerhaven, 32°46'N, 110°74'W, 8200', 1 June 1997, R. Leuschner (1 ♂); Pima Co., Santa Catalina Mts, Summerhaven, 7845', 10–11 June 2008, C, D, Ferris (1 ♂, 3 ♀); Pima Co., Santa Catalina Mts, forestry road 39, 2.7 mi E junction with Mt Lemmon Hwy., mixed pine/oak on east facing slope, 25 May 2005, B. Walsh (1 ♀); Santa Cruz Co., Madera Canyon 5000', 12–14 June 1963, J. G. Franclemont (3 ♀); Santa Cruz Co., Madera Canyon 4880', 11 June 1963, J. G. Franclemont (1 ♂). **New Mexico.** Grant Co., Pinos Altos Mts, S end Cherry Creek Campground, 6753', 32°54'39.1"N, 108°13'44.6"W, conifer forest, 22 May 2007, G. Forbes (1 ♀); Grant Co., Pinos Altos Mts, Cherry Creek Canyon, 6500', 16–17 June 1999, C. D. Ferris (2 ♀); Grant Co., Mimbres Mts, Spring Canyon, 7000', 24 June 2008, C, D, Ferris (1 ♂, 1 ♀); Otero Co., Sacramento Mts, Dry Creek Road 2.1 mi N Rt 82, 6 mi E Rt 244 at Cloudcroft, conifer forest, 17 May 2006, G. Forbes (1 ♀); Otero Co., Haynes Canyon Vista, Sunspot Road 1.2 mi SW Cloudcroft, 8830', conifer forest, 23 June 2006, G. Forbes (1 ♀); Sierra Co., Mimbres Mts, Emory Pass, summit overlook, 8828', conifer forest, 18 May 2006, G. Forbes (1 ♀). **Mexico. Durango.** 30 mi W Durango, 8000', 6 May 1961, Howden & Martin (1 ♂). Paratypes deposited in CDF, CNC, CUIC, JBW, NMSU, RL, USNM.

Etymology. *Rubra* is taken from the Latin for red and refers to the reddish color of the forewings and body of the moth.

Diagnosis. *Hypotrix rubra* can be recognized by the reddish-brown forewing with the maculation obscure except for a diffuse reddish-brown medial line that is sharply



Figures 19–22. *Hypotrix* male genitalia. **19** *H. ferricola* **20** *H. diplogramma* **21** *H. parallela* **22** *H. rubra.*

angled at the reniform spot, a dark-gray spot in the lower part of the reniform spot, and an almost straight red subterminal line. It is most closely related to *H. parallela*, both species having similar male and female genitalia with a bulbous cornutus on a submedial diverticulum in the vesica. They differ in that *H. rubra* lacks spiniform setae on the middle and hind tibiae, the uncus is much broader apically, the cucullus extended farther ventrally, and the vesica in the male and appendix bursae in the female are correspondingly longer.

Description. Adults. Male and female similar in size, color, and maculation. Forewing length: 12–16 mm. *Head* – Male antenna with individual segments swollen laterally, slightly diamond-shaped; ventral setae with tendency to divide into two tufts on each side. Female antenna filiform, minutely setose ventrally. Palpi and head unicolorous, clothed with deeply-forked, reddish-brown scales. *Thorax* – Covered with deeply-forked, reddish-brown scales; without tufting. *Legs*: Covered with reddish-brown scales with scattered dark-gray scales,

especially on outer side of tarsi. Tibia without spiniform setae. *Wings*: Dorsal forewing reddish brown (occasionally reddish-gray) with maculation obscure except for a diffuse red medial line, sharply angled at reniform spot, a dark-gray spot in lower part of reniform spot, and an even, slightly concave red subterminal line; some specimens with patch of gray scales near apex of wing. Fringe similar to forewing ground color, or slightly darker red. Dorsal hindwing dirty white or very pale fuscous with darker fuscous on discal spot, wing veins, and wing margin. Fringe pale reddish buff with diffuse darker medial line. *Male genitalia* – Uncus gradually widening from base, then abruptly expanded and wedge shaped at apex. Valve with well-defined triangular cucullus with narrow "neck," dorsoapical corona, and one stout seta at protruding anal angle; digitus short, tapered and lightly sclerotized, projecting into base of ventral notch proximal to cucullus; clasper a slightly upcurved rod extending to dorsal margin of valve; membranous part of sacculus extends along ventral half of valve to notch anterior to cucullus; lower margin of valve evenly curved into notch. Aedeagus with cluster of small spines at apex on right side. Vesica very long and gently coiled, about 6 × as long as aedeagus; vesica swollen at base with 16–18 long stout cornuti forming longitudinal row along swollen area and transverse row across middle of it; cornutus with bulbous base on a short diverticulum at about 1/5 from base of vesica. *Female genitalia* – Corpus bursae membranous, rounded; appendix bursae long, narrow, and coiled, about 3 × as long as corpus bursae. Ductus bursae about as long as corpus bursae, heavily sclerotized on sides, more so on left side. Anal papillae narrow and sharply pointed with large bulbous base.

Distribution and biology. *Hypotrix rubra* occurs from southwestern New Mexico and southeastern Arizona southward to the State of Durango in northern Mexico. Adults have been collected between early May and early July in ponderosa pine forests and mixed woodlands of pine and oak.

Hypotrix spinosa (Barnes & McDunnough, 1912), comb. n.

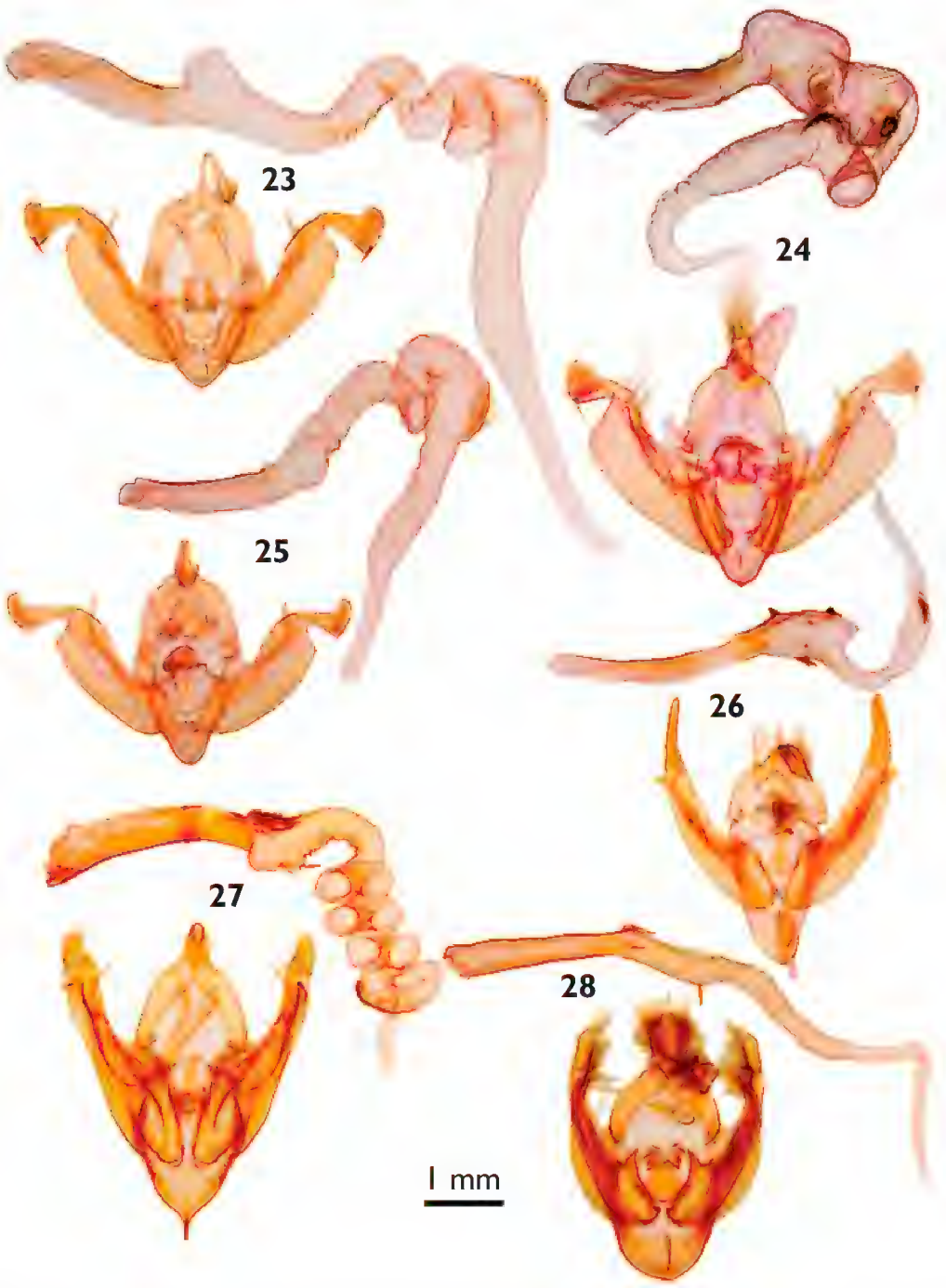
Figs 6, 23, 38

Trichorthosia spinosa Barnes & McDunnough, 1912: 9.

Type material. Syntypes 2 ♀, USNM, examined. Type locality: Arizona, [Cochise Co., Miller Canyon], Palmerlee.

Other material examined and distribution. Mexico: State of Durango (Sierra Madre Occidental). **USA:** Arizona: Cochise Co. (Chiricahua and Huachuca Mts). New Mexico: Grant Co. (Pinos Altos Mts).

Diagnosis. *Hypotrix spinosa* superficially looks like a brown, well-marked form of *H. parallela*, but averages slightly larger (forewing length: 13–15 mm), the reniform and orbicular spots are larger and outlined by a contrasting pale line, the reniform spot is more rectangular, and spiniform setae are on all three pairs of tibiae. The *male genitalia* also are very different from those of *H. parallela*; the uncus is slender with an abruptly spatulate apex, the cucullis is longer and narrower, and the vesica lacks subbasal cornuti, is more tightly coiled medially, and has a field of minute spines postmedially. In the *female geni-*



Figures 23–28. *Hypotrix* male genitalia. **23** *H. spinosa* **24** *H. ocularis* **25** *H. basistriga* **26** *H. naglei* **27** *H. alamosa* **28** *H. trifascia*.

talia the corpus bursae is smaller than that of *H. parallela*, the appendix bursae is coiled mesially, and the ductus bursae is mostly membranous, sclerotized only posteriorly.

Distribution and biology. *Hypotrix spinosa* is a very rarely collected species that is known only from southeastern Arizona, southwestern New Mexico, and the State of Durango in northern Mexico. Collecting dates range from mid-July to mid-August.

***Hypotrix ocularis* Lafontaine, Ferris & Walsh, sp. n.**
urn:lsid:zoobank.org:act:69C7CE2A-E95A-44BC-A852-0333FCD1837B
Figs 7, 24, 39, 50

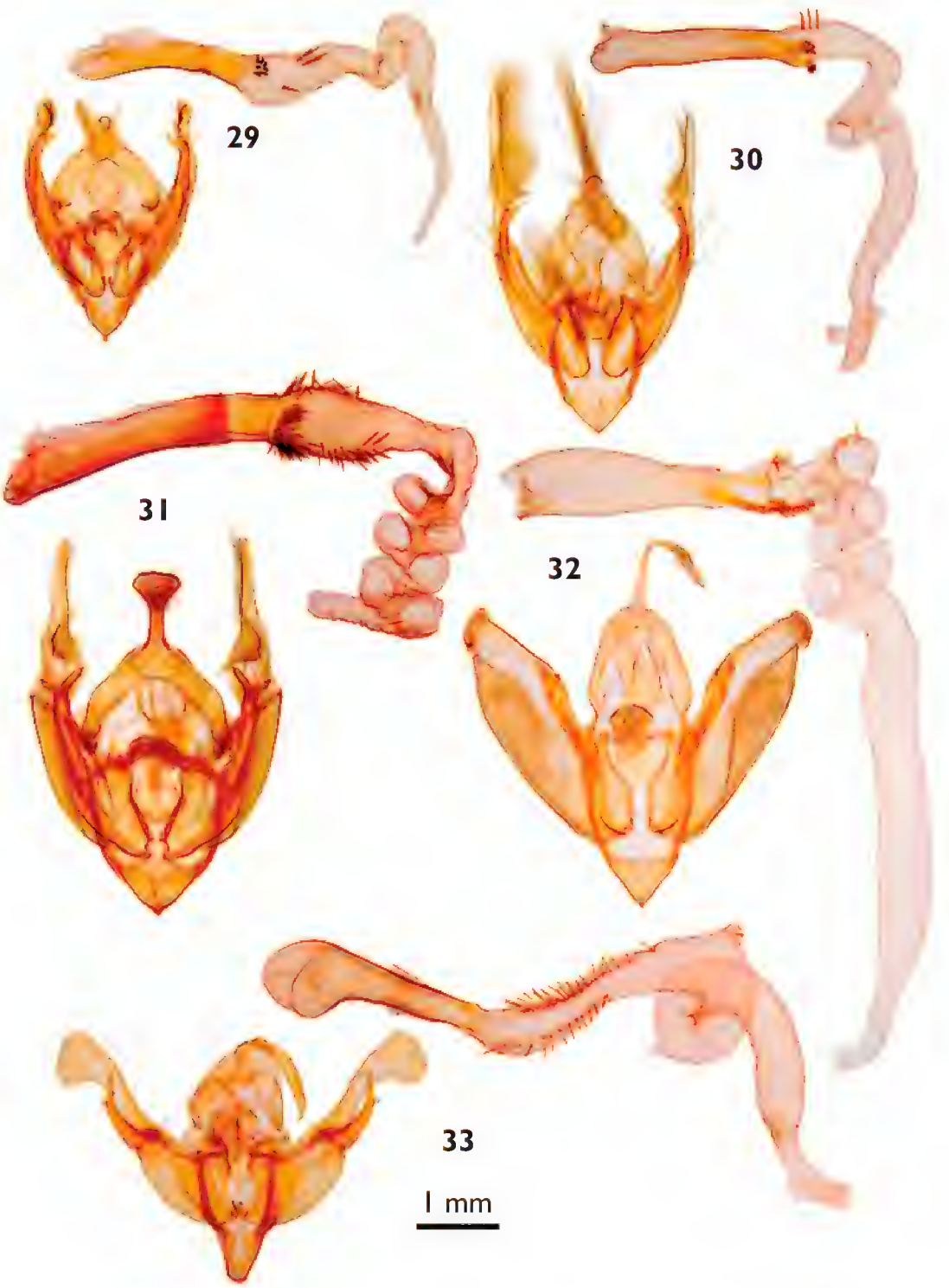
Type material. Holotype ♂. Arizona, Cochise Co., Chiricahua Mts, Onion Saddle, 7700', mixed pine-oak forest, 29 June 2003, B. Walsh. CNC. **Paratypes:** 8 ♂, 4 ♀.

USA, Arizona. Cochise Co., Chiricahua Mts, canyon below Barfoot Park, 8320', 18 June 2009, C. D. Ferris (1 ♂); Cochise Co., Chiricahua Mts, Rustler Park, 8500', 13 June 2001, B. Walsh (1 ♂); Cochise Co., Huachuca Mts, Carr Canyon, 5600' 11 June 2009, C. D. Ferris (1 ♀); Cochise Co., Mule Mts, Banning Creek, north side of Mule Pass, 5700', 21 June 2008, C. D. Ferris (1 ♂). **New Mexico.** Grant Co., Mimbres Mts, Spring Canyon, 7000', 24 June 2008 (1 ♂); 22 June 2009 (1 ♂, 1 ♀), C. D. Ferris; New Mexico, Grant Co., Pinos Altos Mts, 32°58.7'N 108°13.4'W 7720', 21 June 2009, C. D. Ferris (1 ♀). **Mexico, Federal District.** Lomas, 15–19 June 1939, 20–25 June 1940, T. Escalante (3 ♂, 1 ♀). Paratypes deposited in CDF, CNC, JBW, RL, USNM.

Etymology. The name of this species, *ocularis*, is Latin for eye and refers to the eye-like reniform spot on each forewing.

Diagnosis. *Hypotrix ocularis* can be recognized by the pale gray, or brownish-gray forewing, the pale rounded orbicular spot with a black central pupil or "bull's eye," and the irregular subterminal line. The male genitalia are most similar to those of *H. spinosa* but the apical half of the uncus is broadly spatulate (apically spatulate in *H. spinosa*), and the vesica is much shorter and with fewer coils and a large medial cornutus. The female genitalia also are similar to those of *H. spinosa*, but the corpus bursae is larger, the appendix bursae smaller, and the anal papillae more sharply pointed.

Description. Adults. Male and female similar in size, color, and maculation. Forewing length: 14–16 mm. *Head* – Male antenna with individual segments slightly swollen and rounded laterally; ventral setae with tendency to divide into two tufts on each side. Female antenna filiform, minutely setose ventrally. Palpi and head clothed with slightly-forked, pale brownish-gray strap-like scales, some black tipped. *Thorax* – Covered with similar scales to those of head; without tufting. *Legs*: Appearing speckled with mixture of pale gray and blackish-brown scales. Middle and hind tibiae with one or two spiniform setae near tibial spurs. *Wings*: Dorsal forewing pale gray or pale brownish gray; maculation usually contrasting; basal, antemedial and postmedial lines black, partially double with filling slightly paler than ground color; medial line dark, but diffuse, angled at reniform spot; postmedial line irregular as a thin pale sinuate line with varying amounts of dark speckling on proximal margin; wing margin with prominent black dots between wing veins and with black spot at apex; orbicular spot a contrasting rounded pale spot, partially outlined with dark scales and with black central spot, resembling a "bull's eye;" orbicular spot separated from antemedial line by distance equal to width of line; reniform spot with both sides concave, so more 8-shaped than kidney shaped, filled with pale reddish-brown shading outlined by a pale line and with a large black spot in lower part of Figure 8. Fringe slightly paler than forewing ground color and with darker gray medial line. Dorsal hindwing pale fuscous with darker fuscous on discal spot, wing veins, postmedial line, and marginal 1/3 of wing; a series of black dashes on wing margin between veins. Fringe pale gray with thin dark-gray medial line. *Male genitalia* – Apical 1/2 of uncus broadly spatulate. Valve with well-defined triangular cucullus with narrow "neck," dorsoapical corona, and one stout seta at rounded anal angle; digitus short, tapered, ending before reaching notch proximal to cucullus; clasper strongly upcurved, extending



Figures 29–33. *Hypotrix* and *Anhypotrix* male genitalia. **29** *H. optima* **30** *H. hueco* **31** *H. lunata* **32** *H. purpurigera* **33** *Anhypotrix tristis*.

beyond dorsal margin of valve; membranous part of sacculus very large, with flap extending over most of sclerotized part of sacculus and along ventral half of valve to notch anterior to cucullus; lower margin of valve rounded into notch. Aedeagus unarmed. Vesica short and stout, about 3 × as long as aedeagus; vesica swollen at base, without cornuti, with three half coils in middle third; a large stout cornutus near middle of vesica and a brush-like cluster of spines postmedially. *Female genitalia* – Corpus bursae membranous, oval; appendix bursae only slightly longer than corpus bursae, strongly ribbed, with three partial coils. Ductus bursae about 2/3 as long as corpus bursae, lightly sclerotized except posterior 1/4. Anal papillae narrow and sharply pointed with sclerotized bulbous base.

Distribution and biology. *Hypotrix ocularis* occurs from southwestern New Mexico and southeastern Arizona southward to Mexico City. Adults have been collected in June.

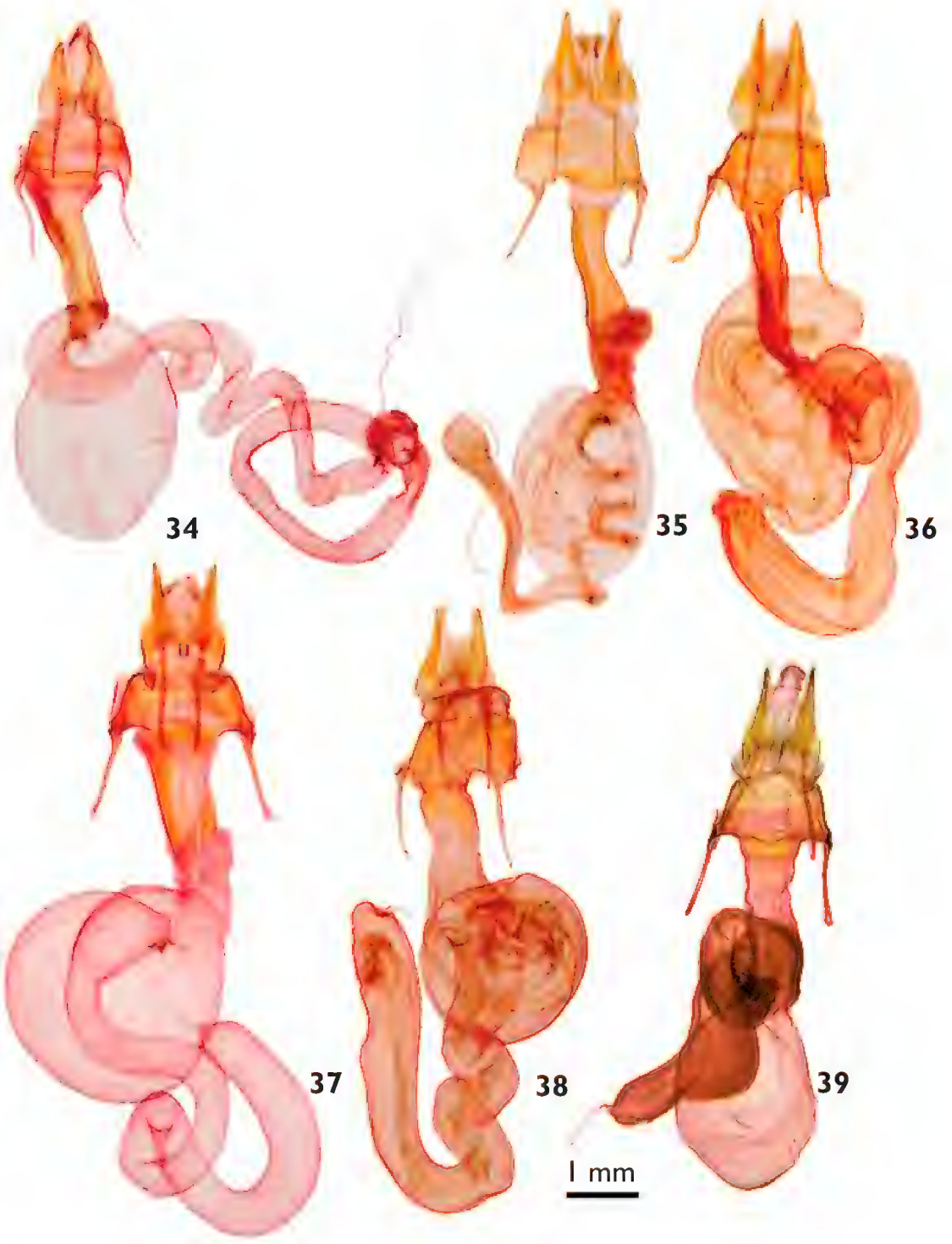
***Hypotrix basistriga* Lafontaine, Ferris & Walsh, sp. n.**
urn:lsid:zoobank.org:act:1D9C6212-F3A9-4C8B-B95D-D024061EE26D
Figs 8, 25, 40

Type material. Holotype ♂. Arizona, Graham Co., Pinaleno Mts, Cummingham Campground, 9,000', ponderosa pine habitat, 14 June 2005, B. Walsh. CNC. **Paratypes:** 4 ♂, 1 ♀. **USA, Arizona.** [Apache Co.], White Mts, Greer, 8300', 26 June 1968, R. H. Leuschner (3 ♂, 1 ♀); [Apache Co.], White Mts, Greer, 8300', 24–25 July 1965, R. H. Leuschner (1 ♂). Paratypes deposited in CNC, JBW, RL.

Etymology. *Basistriga* is Latin and refers to the black dash or streak at the base of the forewing.

Diagnosis. *Hypotrix basistriga* can be recognized by its small size, streaked appearance created by the black basal dash and the combination of black on the forewing veins and pale gray-brown shading between the veins, the orbicular spot touching the outer edge of the antemedial line, and the obscure subterminal line. The male genitalia are most similar to those of *H. ocularis* but in *H. basistriga* the corona extends along the entire outer margin of the cucullus, there is no stout cornutus at the anal angle of the cucullus, and the vesica is much longer and without a large medial cornutus. The female genitalia also similar to those of *H. ocularis*, but in *H. basistriga* the appendix bursae is much longer.

Description. Adults. Male and female similar in size, color, and maculation. Forewing length: 12–13 mm. *Head* – Male antenna with individual segments slightly swollen and rounded laterally; ventral setae with tendency to divide into two tufts on each side. Female antenna filiform, minutely setose ventrally. Palpi and head clothed with slightly-forked, pale buff and brown strap-like scales, a few black tipped. *Thorax* – Covered with similar scales to those of head; without tufting. *Legs*: Appearing speckled with mixture of pale gray and blackish-brown scales. Middle and hind tibiae with 2–5 spiniform setae near tibial spurs. *Wings*: Dorsal forewing ground color appearing blotchy because of pale-brown shading mixed with patches of darker-brown; scattered white scales give wing a hoary appearance; wing appearing streaked because of long black basal dash and black shading on wing veins, especially in subterminal and terminal areas; maculation generally obscure; antemedial line with a faint darker gray inner line, a darker gray outer line, filled with pale ground color; postmedial line with faint scalloped inner line followed by diffuse pale gray shading; medial line gray brown, broad but diffuse, angled at reniform spot; postmedial line essentially absent but terminal area partially indicated by generally darker shading that blends into subterminal area; wing margin with small black dots between wing veins; orbicular spot a faint pale patch with a black spot in inner margin forming part of outer element of antemedial line, so antemedial line touching orbicular spot; reniform spot a rectangular pale patch with an elongated black spot or streak in lower proximal corner. Fringe with thin pale basal line, but mainly similar in color to darker ground shading on forewing. Dorsal hindwing very pale fuscous with darker fuscous on discal spot, wing veins, postmedial line, and mar-



Figures 34–39. *Hypotrix* female genitalia. **34** *H. ferricola* **35** *H. diplogramma* **36** *H. parallela* **37** *H. rubra* **38** *H. spinosa* **39** *H. ocularis*.

ginal 1/3 of wing; a broken terminal line indicated by dark fuscous line between some wing veins. Fringe pale buff. *Male genitalia* – Uncus thin from base, abruptly spatulate at apex. Valve with well-defined triangular cucullus with narrow "neck," complete outer corona, without stout seta at anal angle; digitus short, tapered, ending at notch proximal to cucullus; clasper strongly upcurved, extending beyond dorsal margin of valve; membranous part of sacculus not overlapping sclerotized part, extending along ventral 1/3 of valve to notch in valve anterior to cucullus; lower margin of valve angled in to notch. Aedeagus unarmed. Vesica about 3 1/2 × as long as aedeagus; vesica swollen at base, without cornuti, with coil in middle; vesica and a brush-like cluster of long spines postmedially. *Female genitalia* – Corpus bursae membranous, round; appendix bursae about 4 × longer than corpus bursae with

medial coil and curved through 180°, apical 1/2 projects posteriorly. Ductus bursae about 2/3 as long as corpus bursae, lightly sclerotized except posterior 1/4. Anal papillae tapered from large bulbous base.

Distribution and biology. *Hypotrix basistriga* is known only from the White Mountains and Pinaleno Mountains in eastern Arizona. Adults have been collected from mid-June to late July in open ponderosa pine forests.

Hypotrix naglei Lafontaine, Ferris & Walsh, sp. n.

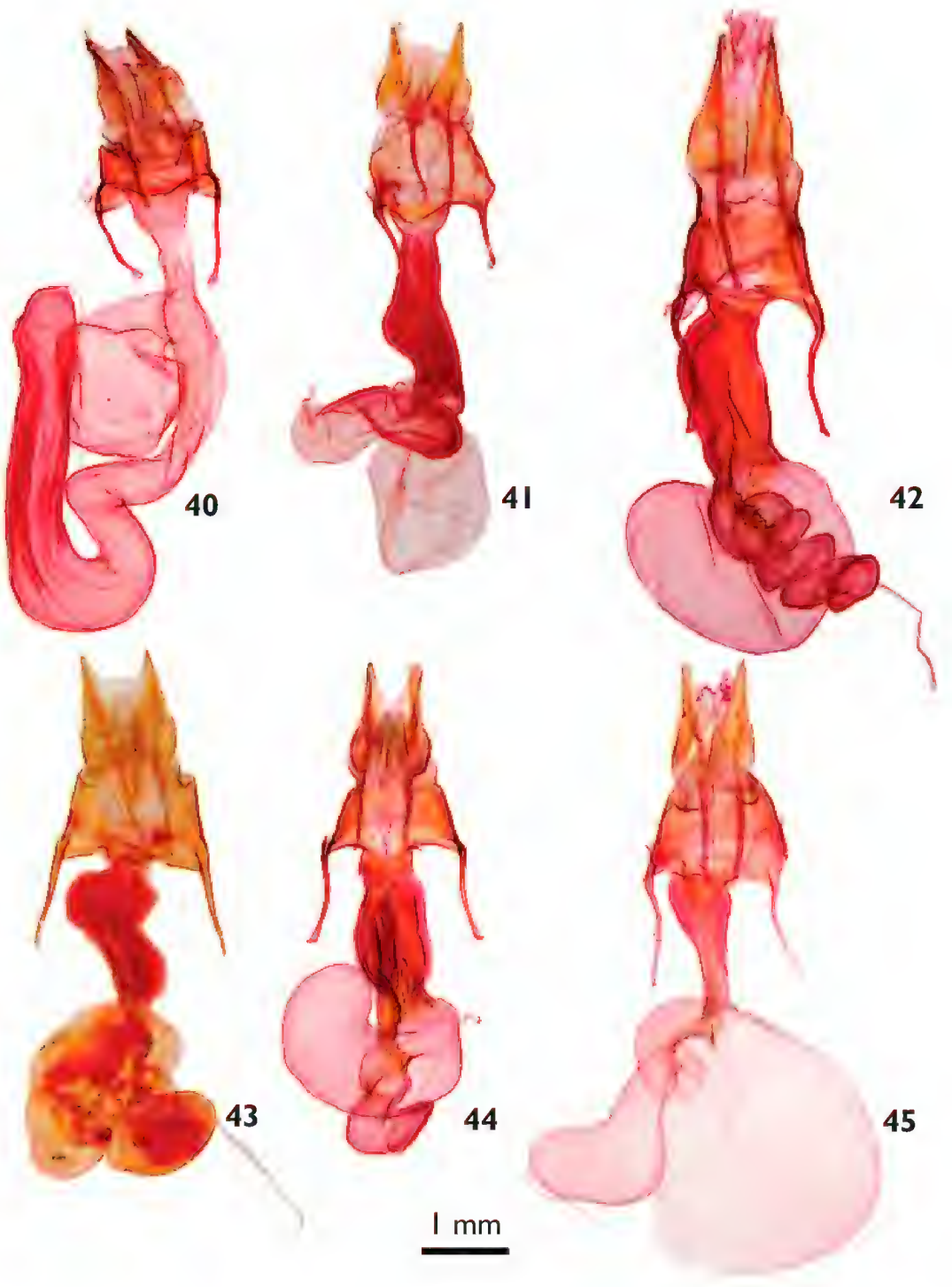
urn:lsid:zoobank.org:act:E737E121-2A58-44CE-B455-F8122C653139
Figs 9, 26, 41

Type material. Holotype ♂. Arizona, Pima Co., Santa Catalina Mts, Mt. Lemmon, 9100', meadow in aspen/pine forest, 1 July 2007, B. Walsh. CNC. **Paratypes:** 23 ♂, 35 ♀. **USA, Arizona.** Same data as holotype (11 ♂, 25 ♀); Apache Co., Greer, 8300', 1–3 July 1993, 8200', 26 June 1968, 4–5 July 1988, R. Leuschner (5 ♀); Cochise Co., Chiricahua Mts, Barfoot Park, 8370', 17 June 2009, C. D. Ferris (1 ♀); Graham Co., Pinaleno Mts, Solider Creek Campground, 9400', Ponderosa Pine habitat, 26 June 2007, B. Walsh (3 ♂, 2 ♀); Pima Co., Santa Catalina Mts, Summerhaven, 7845', 10 June 2008, C. D. Ferris (3 ♂); Pima Co., Santa Catalina Mts, Bear Wallow Road, 7800', 3 July 2004, 23 June 2007, B. Walsh (4 ♂). **New Mexico.** New Mexico, Grant Co., Mimbres Mts, Spring Canyon, 7000', 22 June 2009, C. D. Ferris (1 ♀); Lincoln Co., Capitan Mts, summit Capitan Ridge, 10000', 3 & 10 July 1982, R. W. Holland (1 ♂, 1 ♀); Otero Co., Cathey Canyon overlook at Rt, 6563, 12.4 mi S junction Rt. 330, S of Cloudcroft, 16 June 2006, G. S. Forbes (1 ♂). CDF, CNC, CUIC, JBW, NMSU, RL, USNM.

Etymology. We take pleasure in naming *Hypotrix naglei* after Ray Nagle, a Lepidopterist who has graciously opened his home in the Santa Catalina Mountains for Lepidoptera research and where some of the type series was collected.

Diagnosis. *Hypotrix naglei* is a small silvery-gray or brownish-gray species with the maculation sharply defined in back, and a contrasting pale-orange patch in the lower half of the terminal area on the forewing. The male genitalia are characterized by an elongated, narrow cucullus, an apically rounded digitus, and a mesially broad uncus tapered to a double-toothed apex. The female genitalia have a heavily sclerotized ductus bursae and relatively small corpus bursae and appendix bursae. *Hypotrix naglei* belongs to the second clade of the genus in which the cucullus is elongated, without a distinct "neck," the digitus is apically spatulate, and the uncus is not usually apically spatulate.

Description. Adults. Male and female similar in size, color, and maculation, except female hindwing averages slightly darker than for male. Forewing length: 11–12 mm. *Head* – Male antenna with individual segments very slightly swollen laterally; ventral setae with tendency to divide into two tufts on each side, becoming doubly bifasciculate apically. Female antenna filiform, minutely setose ventrally. Palpi and head clothed with slightly-forked, strap-like scales; appearing grizzled because of areas of



Figures 40–45. *Hypotrix* female genitalia. **40** *H. basistriga* **41** *H. naglei* **42** *H. alamosa* **43** *H. trifascia* **44** *H. optima* **45** *H. hueco*.

white, gray, and brown on scales. *Thorax* – Mainly covered with scales similar to those of head, but black-tipped scales form a transverse band on back of prothoracic collar, around tegulae, and on dorsal metathoracic tuft. *Legs*: Tibiae and tarsi mainly blackish-gray with ring of white scales at apex of each segment. Tibiae without spiniform setae. *Wings*: Dorsal forewing gray or brownish gray; maculation sharply defined in black; basal, antemedial and postmedial lines black, distinctly double with pale-gray filling; medial line dark gray but diffuse and indistinct; postmedial line defined on anterior half of wing only by contrast between orange-brown shading in terminal area and gray in subterminal area; posterior half of subterminal line black and contrasting and dividing pale orange-brown shading in terminal area from gray subterminal area; wing

margin with continuous black terminal line, slightly concave between veins; kidney-shaped reniform spot and rounded orbicular spot surrounded by black outline and filled with dark gray. Fringe with orange-brown scales basally, blending into dark gray scales distally. Dorsal hindwing pale fuscous with darker fuscous on discal spot, wing veins, postmedial line, and marginal 1/3 of wing; terminal line continuous, dark fuscous. Fringe a mixture of white and dark-fuscous scales. *Male genitalia* – Middle of uncus expanded laterally, tapered to double-toothed apex. Valve with elongated, tapered cucullus with only slight "neck" cucullus setose but no differentiated corona; digitus sclerotized, rounded apically, extending beyond ventral margin of valve anterior to neck of cucullus; clasper mainly straight, on inner surface of valve, abruptly upturned proximal to digitus; sacculus well-differentiated as a heavily sclerotized lobe on basal 1/4 of valve with membranous part of sacculus forming small flap overlapping sacculus and tapering to narrow area at ventral notch in valve. Aedeagus unarmed, very long and slender, about 10 × as long as wide and 0.8 × as long as vesica. Vesica basal swollen area with three sclerotized plates, each with short thorn-like cornutus in middle; short and stout, about 3 × as long as aedeagus; apical 2/3 of vesica curving in half coil and cluster of preapical spines. *Female genitalia* – Corpus bursae membranous, oval; appendix bursae only slightly longer than corpus bursae, partial coil at base; ductus bursae 1.3 × as long as corpus bursae with heavily sclerotized ridges and rounded mesial bulge on left. Anal papillae narrow and sharply pointed; base sclerotized, bulbous.

Distribution and biology. *Hypotrix naglei* is known from east-central Arizona (White Mountains), southeastern Arizona (Pinaleno, and Santa Catalina Mountains), south-central New Mexico (Capitan and Sacramento Mountains), and southwestern New Mexico (Mimbres Mountains). Adults have been collected from mid-June to mid-July in open meadows in forests of aspen and pine.

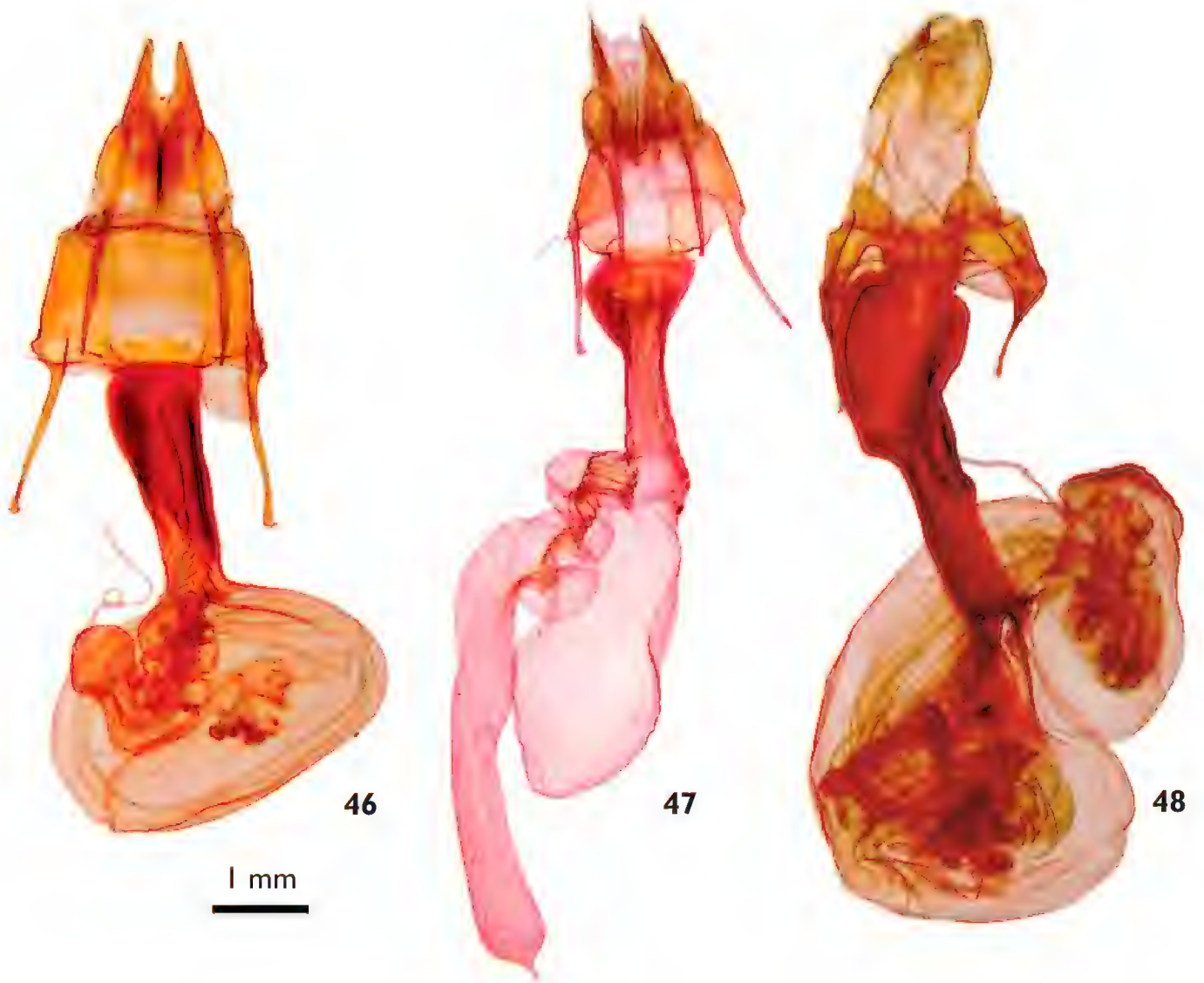
***Hypotrix alamosa* (Barnes, 1904), comb. n.**
Figs 10, 11, 27, 42

Taeniocampa alamosa Barnes, 1904: 201.

Type material. The species was described from a male and a female in USNM. Type locality: USA, Arizona, Huachuca Mts. The female is in better condition and represents the more common dark form, so it is here designated as **lectotype**. It is labeled "*Taeniocampa alamosa* type ♀ Barnes/ Huachuca Mts. Ariz./ Photograph Pl. VI No. 18 [green printed label with "VI" and "18" hand written in black ink]/ Barnes Collection." It is in good condition except that the antennae are missing.

Other material examined and distribution. USA: Arizona: Cochise Co. (Chiricahua and Huachuca Mts), Pima Co. (Santa Catalina Mts), and Santa Cruz Co. (Santa Rita Mts).

Diagnosis. *Hypotrix alamosa* (forewing length 14–16 mm) occurs in two forms. In the darker, more common form (Fig. 10) the forewing is reddish brown with the



Figures 46–48. *Hypotrix* and *Anhypotrix* male genitalia. **46** *H. lunata* **47** *H. purpurigera* **48** *Anhypotrix tristis*.

maculation sharply defined by dark-red lines. The medial area is similar in color to the remainder of the forewing and the postmedial line touches, or almost touches, the reniform spot. Superficially this form is most similar to *Hypotrix hueco* (see under *H. hueco*) and *Xestia bolteri* (Smith), both of which occur with *H. alamosa*. It differs from *Xestia bolteri* in that *H. alamosa* has smaller reniform, orbicular, and claviform spots, and in lacking spiniform setae on the tibiae; *Xestia bolteri* is illustrated in Lafontaine 1998. The pale form of *H. alamosa* looks like the specimens have been bleached, so the forewing is light orange with the maculation weakly defined by fine yellow lines. The dark and light forms frequently occur together and the two syntypes of *H. alamosa* represent a specimen of each form. The *male genitalia* differ from those of other species in many features: the valves are tapered from the base to apex a slightly indented "neck" at the base of the triangular cucullus; the sacculus is very large with a rounded lobe projecting from the dorsal margin and the membranous saccular flap overtops almost the entire sclerotized part; the digitus is wide and truncated apically; the apical half of the uncus is broad and spatulate; the vesica has a mass of cornuti near the apex of the aedeagus, and the apical part of the vesica has four tight coils. In the *female genitalia* the appendix bursae has four tight coils, corresponding to those

in the vesica, and the ductus bursae is heavily sclerotized with a prominent posterior bulge to the left.

Distribution and biology. *Hypotrix alamosa* in known only from southeastern Arizona. Collecting dates range from early June to mid-July and early to late September.

***Hypotrix trifascia* (Smith, 1891), comb. n.**
Figs 12, 13, 28, 43, 52

Taeniocampa trifascia Smith, 1891: 118.

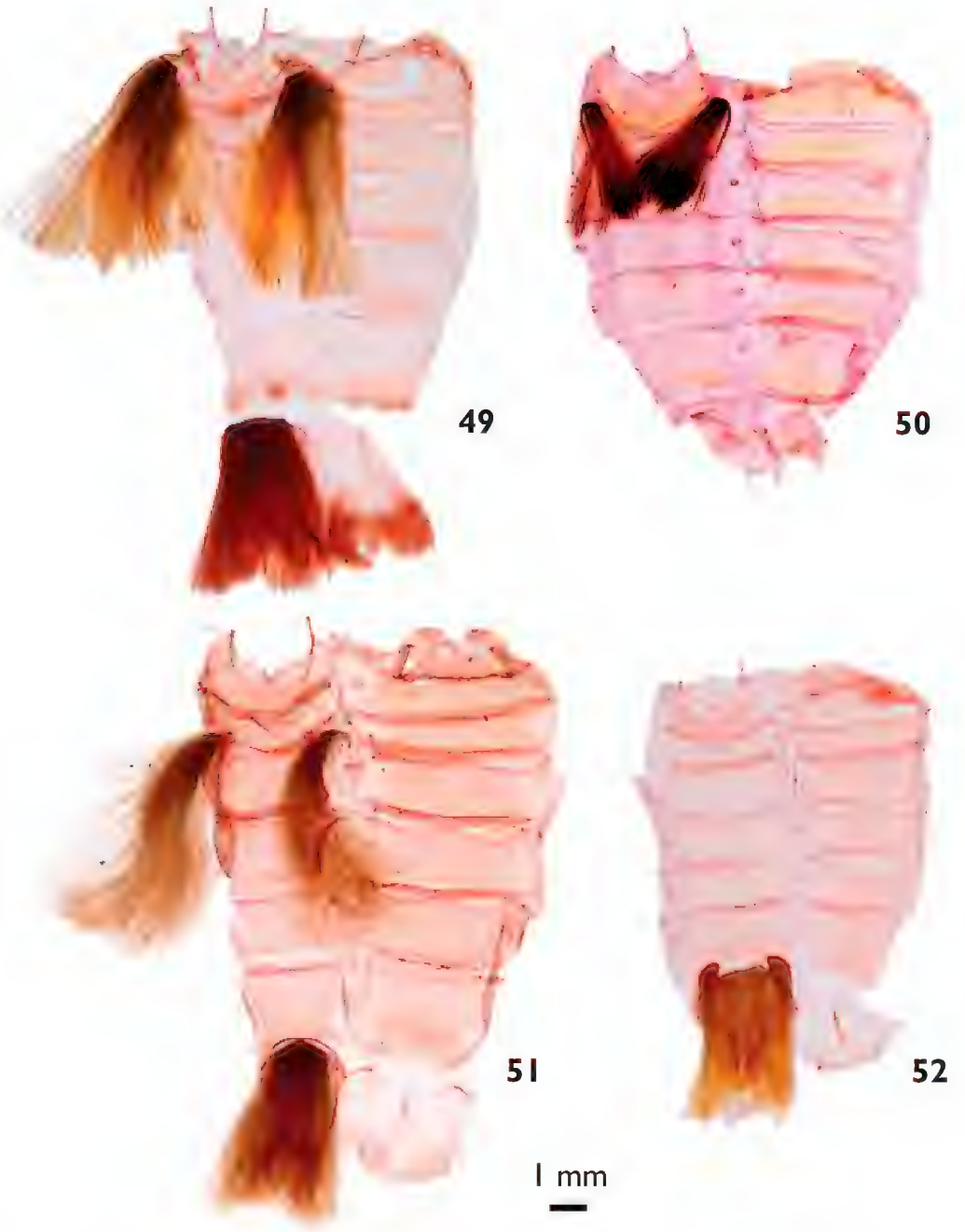
Type material. Lectotype ♂ [USNM, examined]. Designated by Todd (1982). Type locality: USA, Colorado, "foot hills."

Other material examined and distribution. Mexico: States of Chihuahua and Durango (Sierra Madre Occidental). **USA:** Arizona: Cochise Co. (Chiricahua and Huachuca Mts), Graham Co. (Pinaleno Mts), and Pima Co. (Santa Catalina Mts). Colorado: La Plata Co. (San Juan Mts). New Mexico: Catron Co. (Mogollon Mts), Colfax Co. (Sangre de Cristo Mts), and Grant Co (Pinos Altos Mts). Texas: Culberson Co. (Guadalupe Mts). Utah: San Juan Co.

Diagnosis. *Hypotrix trifascia* is smaller than *H. alamosa* in size (forewing length 11–14 mm). It is variable in forewing ground color, varying from pale yellowish buff to dark reddish orange. As the name implies, the two transverse lines and the subterminal line are prominently marked by light and dark lines and are relatively straight and at least partially parallel, creating its distinctive "three-fascia" appearance. The hindwing is translucent white with a slight pinkish blush. The *male genitalia* are similar to those of *H. alamosa*, but in *H. trifascia* the dorsal process of the sacculus is pointed and the saccular flap is less extensive. The uncus is unique in *H. trifascia*; it is broad mesially, narrows subapically, and broad and truncated at apex. The vesica is about 2 × as long as the aedeagus, gently coiled, with two basal and one subbasal cornuti. The *female genitalia* are similar to those of *H. alamosa* but in *H. trifascia* the ductus bursae has a posterior bulge to the left and right and a mesial bulge to the right, and the appendix bursae is short with a single coil.

Hypotrix trifascia is closely related to *H. vigasia* (Schaus, 1894), **comb. n.** from the State of Veracruz in southeastern Mexico, but the forewing of *H. vigasia* is buffy-brown with the maculation muted, and the subterminal line is not as straight as in *H. trifascia*. Poole (1989) lists *H. vigasia* as a synonym of *Bombyx agavis* Blasquez, 1870, but the location of the types of *Bombyx agavis*, if any exist, is unknown and the original paintings (Blasquez, 1870, Figs 6, 9) are not identifiable as a noctuid and may be a cossid (Martin Honey, pers. comm.).

Distribution and biology. *Hypotrix trifascia* occurs from southern Utah and Colorado southward through Arizona, New Mexico, and western Texas to northern Mexico. Collecting dates range from early April to mid-July and early to late September.



Figures 49–52. Male abdominal pelts of *Hypotrix*. **49** *H. purpurigera* **50** *H. ocularis* **51** *H. lunata* **52** *H. trifascia*.

***Hypotrix optima* (Dyar, [1920]), comb. n.**
Figs 14, 29, 44

Scriptania optima Dyar, [1920]: 163.

Type material. Holotype ♂ [USNM, examined]. Type locality: Mexico, Mexico City.

Other material examined and distribution. Mexico: Federal District, State of Durango (Sierra Madre Occidental). **USA:** Arizona: Cochise Co. (Chiricahua Mts).

Diagnosis. *Hypotrix optima* is a small *Hypotrix* (forewing length 11–14 mm) with an unmistakable forewing pattern. The mainly orange and gray pattern is dominated by the pale yellow shading around the orbicular spot that forms a flat-bottomed wedge mark between the dark gray reniform and orbicular spots, and the yellow streak at the forewing

apex. Dark-gray shading in the basal area, on the reniform and orbicular spots, and in the subterminal area gives the forewing a distinctive blotchy look. The hindwing is translucent white in both sexes. The *male genitalia* are most similar to those of *H. trifascia*, but the valves are more slender and the apical half of the uncus is broad and spatulate. The vesica is about 2 × as long as the aedeagus with a tight cluster of cornuti at the base, several scattered spike-like cornuti subbasally, and a cluster of minute spines subapically after a postmedial coil. The *female genitalia* are similar to those of *H. trifascia* but the corpus bursae is curved rather than oval, and the ductus bursae is heavily sclerotized with long medial bulges on both sides.

Distribution and biology. *Hypotrix optima* occurs from southeastern Arizona and central New Mexico southward to Mexico City. Collecting dates range from mid-June to mid-July.

***Hypotrix hueco* (Barnes, 1904), comb. n.**
Figs 15, 30, 45

Mamestra hueco Barnes, 1904: 198.

Type material. Syntypes [USNM, examined]. Type locality: USA, Arizona, Huachuca Mts.

Other material examined and distribution. USA: Arizona. Cochise Co. (Chiricahua and Huachuca Mts), Graham Co. (Pinaleno Mts), and Santa Cruz Co. (Santa Rita Mts).

Diagnosis. *Hypotrix hueco* is superficially similar to *H. alamosa*, but averages larger (forewing length: 14–16 mm), the medial area is pale with whitish shading that contrasts with the darker color of the basal and subterminal areas, and the postmedial line is well removed from the outer edge of the reniform spot. The outward displacement of the postmedial line results in a very narrow subterminal area, similar in width to the terminal area. Surprisingly, the *male genitalia* are most similar to those of *H. lunata*, with a high dorsal tuft of setae on the broadly spatulate uncus and the cucullus is long and tapered with a folded depressed area at the base of the dorsal margin. The vesica is about 3 × as long as the aedeagus; there are two spiny clusters where the aedeagus joins the vesica, a row of three long spike like cornuti near the vesica base, and a premedial coil. The female genitalia are similar to those of H. lunata, but the appendix bursae has only one coil.

Distribution and biology. *Hypotrix hueco* is known only from southeastern Arizona. Collecting dates range from mid-June to mid-August.

***Hypotrix lunata* (Smith, 1906), comb. n.**
Figs 16, 31, 46, 51

Urasogastra lunata Smith, 1906: 13.

Type material. Lectotype ♂ [AMNH, examined]. Lectotype designated by Todd (1982). Type locality: USA, Arizona, Huachuca Mts.

Other material examined and distribution. Mexico: Durango. **USA:** Arizona. Cochise Co. (Huachuca Mts) and Santa Cruz Co. (Patagonia and Santa Rita Mts).

Diagnosis. *Hypotrix lunata* is a relatively large moth (forewing: 15–17 mm) that is superficially unlike any other species in North America. The forewing is a hoary gray with a large entirely black crescent-shaped reniform spot that is fused posteriorly with the black orbicular spot. It is most closely related to *Hypotrix quindiensis* (Draudt, 1924) that was originally described as a form of *H. lunata*; it occurs from Colombia to Peru. *Hypotrix lunata* differs from *H. quindiensis* in having a smaller orbicular spot (the two sides of the black mark formed by the fusion of the spots are similar in size in *H. quindiensis*), the postmedial line is an even black line (an irregular series of black dashes in *H. quindiensis* ending in a black spot on the costa), the basal line is obscure (a contrasting black spot in *H. quindiensis*) and the hindwing is fuscous, not dirty white. In the genitalia of *H. quindiensis* there are two rather than three coils in the vesica and appendix bursae and only the posterior half of the ductus bursae is sclerotized. *Hypotrix purpurigera* (Fig. 17) and several of its South American relatives also have black reniform and orbicular spots that are frequently fused posteriorly, creating a wide V-shaped mark. Within the North American fauna the *male genitalia* of *Hypotrix lunata* are most similar to those of *H. hueco*, but differ in that only the apical part of the uncus is expanded in *H. lunata* whereas the apical 2/3 is wide in *H. hueco*, the clasper is stouter and abruptly tapered apically in *H. lunata*, and the dorsal lobe on the sacculus is much larger. The vesica is very different from that of *H. hueco* in having much more extensive basal cluster of spines and subbasal cornuti in a longitudinally ribbed basal swelling, and the vesica has three tight medial coils rather than one as in *H. hueco*. In the *female genitalia* the appendix bursae has a corresponding three coils to those in the vesica and the ductus bursae is more heavily sclerotized.

Distribution and biology. *Hypotrix lunata* occurs from southeastern Arizona (Chiricahua, Huachuca and Santa Rita Mountains) southward to the State of Durango in northern Mexico. Collecting dates range from late May to mid-September, probably representing two generations.

Anhypotrix Lafontaine, Ferris & Walsh, gen. n.

urn:lsid:zoobank.org:act:95031C4C-626F-4B91-803F-7C322588E240

Type species. *Polia tristis* Barnes & McDunnough, 1910: 152.

Etymology. The generic name *Anhypotrix* is a reference to this species being removed from its former congeners. From the Greek *An* [not] *Hypotrix*.

Diagnosis. The genus *Anhypotrix* differs from *Hypotrix* in that the uncus in *Anhypotrix* is cylindrical, tapered to a spine-tipped apex, the clasper is massive, gently curved on the ventral margin of the valve with a preapical tooth, the digitus is vestigial, the aedeagus has a large bulbous base and a narrow neck-like apex, and the details of the vesica are different. The female genitalia in *Anhypotrix* differ from those of *Hypotrix* in having

lightly sclerotized anal papillae that are short and rounded posteriorly, and abdominal segment eight has a rounded sclerotized posterior plate on each side of the ostium.

Anhypotrix tristis never associates with species in the genus *Hypotrix* in barcode analyses, a result already suggested by the very different form of male clasper and female anal papillae. No other known species has similar male genitalia and the barcode results do not suggest any known genus with which the species can be associated so we describe a new genus for it. We place it with the other southwestern genera that have spiniform tibiae (*Hypotrix* (some species), *Trichofeltia* McDunnough, and *Mimobarathra* Barnes & McDunnough) and within this group after *Hypotrix* because of the similarities in the form of the various parts of the bursa copulatrix in the female genitalia.

Description. Adult: *Head* – Frons rounded; labial palpus with apical segment about 1/4 as long as second segment; male antenna narrowly biserrate, individual segments diamond shaped, bifasciculate; female antenna filiform, densely setose ventrally; eye rounded, hairy; ocellus present. *Thorax* – Thorax clothed with hair-like scales and spatulate, apically serrated scales that form a slightly raised tuft on the prothorax, and a partially divided tuft on the metathorax that blends with a broad dorsal tuft of scales on the first abdominal segment. *Legs*: spiniform setae on middle and hind tibae near tibial spurs, and in three ventral rows on tarsi. *Wings*: forewing venation typically quadrifine, cubital vein appearing four branched; hindwing with typical trifine venation (i.e., M2 reduced, about 2/3 down cell and parallel to M3. *Abdomen* – basal abdominal brushes and pockets absent. Eighth abdominal sternite of male with an eversible coremata with a tuft of long setae. *Male genitalia* – *Uncus*: decurved, cylindrical, abruptly tapered to flat heavily sclerotized apex. *Valva*: symmetrical, basally broad, narrowed postmesially into an elongated "neck," broadening to rounded cucullus with scattered slender setae forming partial corona; sacculus short, heavily sclerotized, with a large, rounded dorsal process, but without membranous flap; clasper near middle of valve on ventral margin, stout and heavily sclerotized, slightly upturned apically with preapical tooth; clasper connected to apex of sacculus and valve costa by long sclerotized rods; digitus absent. *Aedeagus*: base bulbous, tapered to narrow "neck" at apex, smooth (without spines or spinules); everted vesica tubular, about 3 × as long as aedeagus, basal 1/4 with double row of 23–26 long cornuti on left side and single row of 12–14 long cornuti on right; vesica with postmedial coil; small diverticulum at base of coil with apical cornutus and small diverticulum in middle of coil; apex of vesica covered with spinules. *Female genitalia* – Corpus bursae gourd shaped, rounded anteriorly, tapered posteriorly into wide appendix bursae on right side with single coil. Ductus bursae heavily sclerotized, middle surface rugose with thicker bands of sclerite; posterior half of ductus abruptly wider and bulging to sides, especially on left, then constricting to narrower ostium. Abdominal segment eight extended posteriorly into rounded sclerotized plate on each side of ostium. Anterior apophyses rod-like, widening posteriorly, slightly longer than abdominal segment eight. Posterior apophyses about 2 × longer than anterior apophyses. Anal papillae lightly sclerotized, slightly wider mesially, gradually tapered to rounded apex; surface covered with long hair-like setae.

Distribution. Known from New Mexico, Arizona, and northern Mexico.

***Anhypotrix tristis* (Barnes & McDunnough, 1910), comb. n.**
Figs 18, 33, 48

Polia tristis Barnes & McDunnough, 1910: 152.

Type material. Holotype ♂. USNM, examined. Type locality: USA, Arizona, [Cochise Co., Miller Canyon], Palmerlee.

Other material examined and distribution. Mexico: State of Durango (Sierra madre Occidental). **USA:** Arizona: Apache Co. (White Mts), Cochise Co. (Chiricahua amd Huachuca Mts); New Mexico: Catron Co. (Mogollon Mts), Colfax Co. (Sangre de Cristo Mts), Grant Co. (Pinos Altos Mts), McKinley Co. (Zuni Mts), and Socorro Co. (San Mateo Mts).

Diagnosis. *Anhypotrix tristis* can be recognized by the blackish-gray and pale gray streaked forewing pattern. The streaked appearance is enhanced by the strongly zigzagged antemedial line and a deep V-shaped notch in the postmedial line with a black bar connecting it to the antemedial line. There is also a black basal dash and a black and white patch near the anal angle of the wing, this latter patch giving the moth the appearance of a large (forewing length: 15–18 mm) *Lacinipolia* McDunnough. In many specimens there is some brown shading on or beyond the reniform spot, below the orbicular spot, and near the anal angle. The hind wing in males varies from dirty white (e.g., Fig. 18), to entirely fuscous, with dark-fuscous on the veins, postmedial line and wing margin. The hindwing in females averages darker than in the males. The male genitalia are best recognized by the massive ventral clasper, the tapered uncus, and the form of the vesica and the female genitalia by the rounded anal papillae and shape of the bursa copulatrix.

Distribution and biology. *Anhypotrix tristis* occurs from eastern Arizona and northern New Mexico southward in the Sierra Madre Occidental to the State of Durango in Mexico. Adults have been collected in conifer forest habitats from early May until early August.

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